

REMARKS

Claims 1-26 are pending in the present case. In the Office Communication mailed June 24, 2009, the Examiner made a number of new rejections. For clarity, these are summarized below in the order in which they are addressed herein:

- I.** Claim 6 stands rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention;
- II.** Claims 1-10 and 12-14 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Angeletakis et al. (US 6,121,344);
- III.** Claims 15 stands rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Angeletakis et al. (US 6,121,344);
- IV.** Claims 16-24 and 26 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Angeletakis et al. (US 6,121,344);
- V.** Claim 11 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Angeletakis et al. (US 6,121,344) as applied to claim 1 above, and further in view of Teramae et al. (US 2002/0022677); or further in view of Sato (US 5,773,489) ; and
- VI.** Claim 25 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Angeletakis et al. (US 6,121,344) as applied to claim 16 above, and further in view of Teramae et al. (US 2002/0022677); or further in view of Sato (US 5,773,489).

- I.** Claim 6 stands rejected under 35 U.S.C. 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Examiner notes that Claim 6 depends from claim 5, which recites dental material additionally contains pyrogenic and/or wet-precipitated silicic acids, but Claim 6 recites an amount of silicic acids of 0 to 30 wt%. The Examiner asserts that it is unclear how the dental material of claim 6 could contain 0 wt% of silicic acid. For business reasons and without acquiescing to the

Examiner's arguments, and reserving the right to prosecute the original or similar claims in one or more future applications, Claim 6 is herein amended to recite that the dental material contains "dental material contains up to 30% by weight of the pyrogenic and/or wet-precipitated silicic acids." Applicants submit that Claim 6 as amendment is not indefinite and respectfully request that this rejection be withdrawn.

The Claims Are Not Anticipated

II. Claims 1-10 and 12-14 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Angeletakis et al. (US 6,121,344)

III. Claims 15 stands rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Angeletakis et al. (US 6,121,344);

IV. Claims 16-24 and 26 stand rejected under 35 U.S.C. 102(b) as allegedly being anticipated by Angeletakis et al. (US 6,121,344).

The Examiner notes that Angeletakis et al (US 6,121,344) discloses a dental composite resin, with example A comprising 27.6 wt-% of resin, 63.7 wt-% of a ground structural filler (silanated barium aluminoborosilicate) with a mean particle size of 0.62 mm and two types of fumed silica as a nanoscale filler: 5 wt-% of silanated AEROSIL® OX-50 hydrophilic fumed silica with an average particle size of 40 nm and 3.7 wt-% of CAB-O-SIL® TS-530 hydrophobic fumed silica having an average particle size of 20 nm. (Office Action, page 3).

The Examiner asserts that this reference anticipates claims 1-10, 12-14, 15, 16-24 and 26 and further asserts that the reference:

"teaches all of the claimed reagents and was prepared under similar conditions. Therefore the claimed effects and physical properties, i.e. the nanoscale filler having at least 20 particle number% of nanoparticles as aggregated particles, would inherently be achieved by a composition with all the claimed reagents."

Office Action, page 3.

However, this is not correct. The Angeletakis reagents do not provide the nanoparticles compositions recited in the claims, and conditions as noted by the Examiner under which the materials are processed are not similar. As such, the Examiner's conclusion that Angeletakis inherently produces the same material is erroneous.

The reagents of Angeletakis do not provide the recited components

As noted above, Angeletakis recites two particle types: AEROSIL® OX-50 hydrophilic fumed silica and CAB-O-SIL® TS-530 hydrophobic fumed silica. It is well known that fumed silica particles are aggregates in which multiple primary particles are bound together via strong bonds, such as, *e.g.*, sinter bridges. See enclosed "CAB-O-SIL® Fumed Silica in Cosmetic and Personal Care Products", page 1, Cabot). Cabot discloses that the average particle size for their fumed silica aggregate particles is 0.2 to 0.3 microns, or 200-300 nm. The primary particles are substantially smaller, as each aggregate particle is composed of many primary particles.

The AEROSIL® OX-50 particles recited are also fumed silica. The Examiner cites Angeletakis as teaching that the particle size is 40nm. However, the particle size referred to in Angeletakis with respect to AEROSIL® OX-50 is the primary particle size as can be seen, *e.g.*, from the technical specifications for AEROSIL® OX-50, attached hereto.

As noted above, fumed silica consists of aggregate particles that are formed from primary particles bound together by strong bonds into larger particles. Disclosure of a fumed silica composition made from a *primary* particles 40nm does not indicate the presence of 40 nm particles, or of particles having a diameter of less than 200 nm.

Each of the claims recite material in which at least 50% by weight of the recited nanoparticles have a particle diameter of less than 200 nm. None of the components disclosed by Angeletakis provide nanoparticles in which at least 50% by weight of the recited nanoparticles have a particle diameter of less than 200 nm.

The conditions of Angeletakis are not similar, and do not produce the recited material

The Examiner asserts that Angeletakis teaches use of the recited reagents under "similar conditions" to those of the instant invention. Office Action page 5. Applicants respectfully disagree. Angeletakis teaches that "the filler containing the physically admixed components listed in TABLE 3 are added slowly over a period of 3 hours. (column 7, lines 7-12). The composite is subsequently mixed for another hour and the de-aerated under attenuated oxygen pressure" (column 7, lines 8-12). Clearly, these conditions do not suffice to break up the Aerosil or CAB-O-SIL aggregates so as to produce particles in the size range recited in the instant claims.

In contrast, the specification of the instant application teaches processes of incorporating fillers into dental material such that the agglomerates and aggregates are destroyed to a substantial extent. For example, in preferred embodiments, the aggregates are destroyed to the extent that at least 50% by weight of the nanoparticles have a diameter of less than 100 nm. See page 4, lines 23-30.

The specification provides detailed description of processing steps for producing the material of the claims. For example, the specification recites that "[a]proximately 50 g of the nanofiller B were added to 250 g of a 1:1 mixture of bisphenol A diglycidyl methacrylate and triethylene glycol dimethacrylate and incorporated in 90 minutes at 1200 rpm with the aid of a Dispermat. A further 40 g of the nanofiller B were then added, and the mixture was dispersed for 1 hour at 1000 rpm and subsequently overnight at 500 rpm..." (see page 31, lines 28-34).

Furthermore, the specification teaches specific methods of determining the resulting particle size in the materials processed as described above. See, *e.g.*, page 23, line 24 to page 24 line 10.

Thus, the conditions under which the material of Angeletakis was prepared are not similar to the conditions taught in the specification and cannot result in the aggregates being destroyed sufficiently to provide feature c) of the instant claims.

Applicants therefore respectfully submit that Angeletakis *et al.* neither anticipates the present invention, nor does it lead a person skilled in the art in the direction of the invention. On the contrary, by teaching the addition of the filler containing the physically admixed components slowly over a period of 3 hours, the reference leads a person skilled

in the art away, since it discloses a process in which the mechanical stress applied to the filler is to be kept to a minimum.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. MPEP 2131, citing *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d. 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). For the reasons recited above, Applicants submit that Angeletakis fails to teach each and every feature of Claims 1-10, 12-14, 15, 16-24 and 26, and therefore fails to anticipate these claims. Applicants respectfully request that these rejections be withdrawn.

V. Claim 11 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Angeletakis et al. (US 6,121,344) as applied to claim 1 above, and further in view of Teramae et al. (US 2002/0022677); or further in view of Sato (US 5,773,489).

The Examiner states that

“Angeletakis et al teaches the basic claimed composition [as set forth above with respect to claim 1] ...”.

The Examiner further states that

“[a]t the time of invention a person of ordinary skill in the art would have found it obvious to have combined 0.5 to 30 mm organo-inorganic fillers, as taught by Teramae et al. in the invention of Angeletakis et al. ...”

and that

“[a]t the time of invention a person of ordinary skill in the art would have found it obvious to have combined 0.1 to 50 mm in organic-organic composite fillers, as taught by Sato. in the invention of Angeletakis et al. ...”

As the Board of Patent Appeal and Interferences has confirmed, a proper obviousness determination requires that an Examiner make “a searching comparison of the claimed invention – *including all its limitations* – with the teaching of the prior art.”

See In re Wada and Murphy, Appeal 2007-3733, citing *In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995) (emphasis in original). Further, the necessary presence of all claim features is axiomatic, since the Supreme Court has long held that obviousness is a question of law based on underlying factual inquiries, including ... ascertaining the differences between *the claimed invention* and the prior art. *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966) (emphasis added). Indeed, Section 904 of the MPEP instructs Examiners to conduct an art search that covers “*the invention as described and claimed.*” (emphasis added). Lastly, Applicants respectfully direct attention to MPEP § 2143, the instructions of which buttress the conclusion that obviousness requires at least a suggestion of all of the features of a claim, since the Supreme Court in *KSR Int'l v. Teleflex Inc.* stated that “there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR Int'l v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

In sum, it remains well-settled law that obviousness requires at least a suggestion of all of the features in a claim. *See In re Wada and Murphy*, citing *CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) and *In re Royka*, 490 F.2d 981, 985 (CCPA 1974)).

Claim 11 depends on claim 1. As pointed out above, Angeletakis et al does not teach or suggest the basic composition of claim 1 nor does it lead a person skilled in the art in the direction of the invention as described in claim 1. Neither Teramae nor Sato, if combined with Angeletakis, cure this deficiency.

While Applicants do not acquiesce that other elements necessary for establishing *prima facie* obviousness have been met, Applicants submit that the combination of Angeletakis with either Teramae or Sato does not teach or suggest all the features of Claim 11. Applicants respectfully request that this rejection be withdrawn.

VI. Claim 25 stands rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Angeletakis et al. (US 6,121,344) as applied to claim 16 above, and further in view of Teramae et al. (US 2002/0022677); or further in view of Sato (US 5,773,489).

Claim 25 depends on Claim 16. As pointed out above, Angeletakis et al does not teach or suggest the basic composition of claim 16 nor does it lead a person skilled in the art in the direction of the invention as described in claim 16. Neither Teramae nor Sato, if combined with Angeletakis, cure this deficiency.

While Applicants do not acquiesce that other elements necessary for establishing *prima facie* obviousness have been met, Applicants submit that the combination of Angeletakis with either Teramae or Sato does not teach or suggest all the features of Claim 11. Applicants respectfully request that this rejection be withdrawn.

CONCLUSION

For the reasons set forth above, it is respectfully submitted that all grounds for objection and rejection have been addressed and Applicants' claims should be passed to allowance. Should the Examiner believe that a telephone interview would aid in the prosecution of this application, Applicants encourage the Examiner to call the undersigned collect at (608) 218-6900.

Dated: July 6, 2010

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CAB-O-SIL® Fumed Silica in Cosmetic and Personal Care Products

Introduction

CAB-O-SIL® fumed silica is a versatile, efficient additive used in cosmetics and personal care products to achieve one or more important functions.

In liquids:

- rheology control
- suspension
- moisture resistance
- viscosity stability
- emulsification

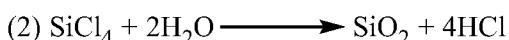
In powders:

- anti-caking
- dry carrier

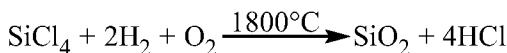
CAB-O-SIL fumed silica's extremely small aggregate size, large surface area, and high purity can provide unique benefits to cosmetic and personal care formulations.

Manufacture

CAB-O-SIL is produced by the vapor phase hydrolysis of silicon tetrachloride vapor in a hydrogen oxygen flame. The reactions are:



Overall reaction:



The combustion process creates silicon dioxide molecules which condense to form particles. The particles collide, attach, and sinter together. The result of these processes is a three-dimensional branched chain aggregate with a length of approximately 0.2 to 0.3 microns. Once the aggregates cool below the fusion point of silica (1710°C), further collisions result in mechanical entanglement of the chains, termed agglomeration. Figure 1 illustrates this process. Further agglomeration takes place in the collection system to yield a fine, white, fluffy powder with an agglomerate size of less than 325 US Mesh (44 microns). Calcining reduces the hydrogen chloride level to less than 100 ppm. Treated grades are manufactured by reacting organo-silicons or other compounds with fumed silica. The treating agent selected produces a product with characteristics meeting specific customer needs. The manufacturing system combined with the high quality of the feedstock insures the purity of the silica.

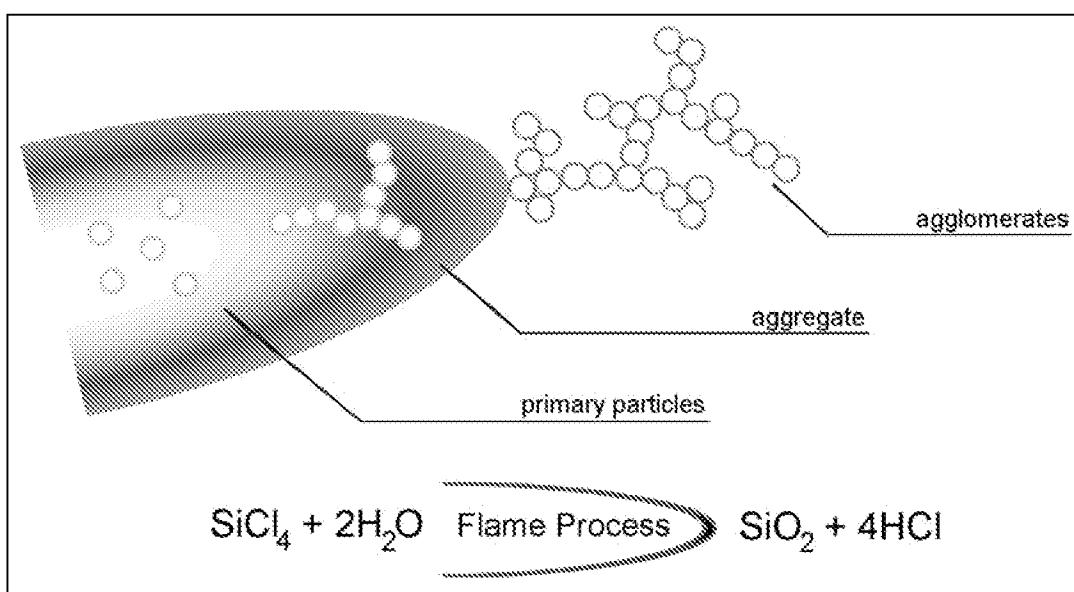


Figure 1:
Schematic diagram of the flame process to manufacture CAB-O-SIL® fumed silica.

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Grades

Both untreated and treated grades of CAB-O-SIL® fumed silica are used in cosmetic and personal care applications. The functions of all untreated grades include thickening liquid systems, suspension of other ingredients, anti-caking of powders, and converting liquid ingredients into powders. CAB-O-SIL M-5 is the most popular untreated grade employed. It is a general purpose grade with a surface area of 200 m²/g. Other untreated grades include H-5, HS-5, and EH-5, with surface areas of 300 m²/g, 325 m²/g, and 380 m²/g, respectively. Grade H-5 is available only from production in Europe and HS-5 only from production in North America. Other grades are available globally. CAB-O-SIL grades with surface areas lower than 200 m²/g are also manufactured but are not generally recommended for cosmetic and personal care applications.

Different untreated grades are recommended based on the consumer's applications as well as their dispersion equipment. Increased thickening ability follows increases in surface area. However, this trend is offset by the decrease in ease of dispersion. In the manufacture of cosmetics and personal care items, low to moderate shear mixing equipment is typically used. Planetary mixers and high-speed dispersers fall into this category. CAB-O-SIL M-5 is the best candidate for applications using these types of mixers. The higher surface area silicas require higher shear to disperse properly in a liquid medium. However, their higher surface area also makes these silicas better suited for use as dry carriers of fragrances or perfumes.

The treated grades of CAB-O-SIL are manufactured with unique surface chemistries to meet specific customer needs. CAB-O-SIL TS-720 treated fumed silica is fully treated with a dimethyl silicone polymer, making it hydrophobic. TS-720 will thicken mineral oil-based formulations as well as offer moisture resistance and viscosity stability at elevated temperatures. CAB-O-SIL TS-610 treated fumed silica is partially treated with dimethyldichlorosilane and slightly less hydrophobic than TS-720. Its uses include gelling, suspending, and anti-caking of

powders. CAB-O-SIL TS-530 treated fumed silica is fully treated with hexamethyldisilazane. This renders it extremely hydrophobic, similar to TS-720. TS-530 is not typically used for thickening applications but rather as an anti-caking additive, a dry carrier for liquid substances, or to enhance the moisture resistance of a product.

Functions

The unique properties of CAB-O-SIL fumed silica offer special benefits in many applications. Among its many functions are those listed below:

Thixotropy—The highly dispersed CAB-O-SIL fumed silica particles form a three-dimensional network in liquid systems. This network formation causes an increase in viscosity of the system. When shear forces are applied, the material flows as a liquid substance, thus facilitating processing of gels and pastes. After a short period of time, the material again "gels."

Suspension—The use of as little as 0.25 to 1.0 wt. % CAB-O-SIL will prevent hard pigment settling, such as in a pearlescent fingernail polish. It will also aid suspension and help prevent nozzle clogging in aerosol products.

Anti-caking—Many dry powder formulations either cake or cease to flow after standing. This condition, usually caused by the adsorption of moisture, may be prevented by the addition of a small amount of CAB-O-SIL.

Viscosity Stability—CAB-O-SIL provides a stable viscosity regardless of the ambient temperature. This is beneficial in lipstick, mascara, makeup, and sunscreen products.

Moisture Resistance—CAB-O-SIL treated fumed silicas will provide added moisture resistance to creams and gels. This is useful in lipsticks, mascara, makeup, suntan lotions, and similar outdoor activity products.

Dry Carrier—CAB-O-SIL fumed silica adsorbs components such as perfumes, essential oils, and some synthetic oils. These can

then be added to dry products while maintaining the free-flow properties of the powder.

Emulsification—CAB-O-SIL®, when added to water in oil or oil in water emulsions, will act as a secondary binder. This function will assist in preventing the separation of oils and fragrances. It is recommended that fumed silica be added to the oil phase.

Applications

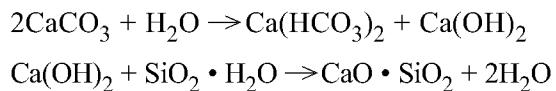
Toothpaste

CAB-O-SIL fumed silica provides thixotropy to toothpaste formulations, thus improving processing. The highly dispersed silica particles hydrogen bond with each other to form a three-dimensional network, which results in increased viscosity. When shear forces are applied, the hydrogen bonds are broken and the material flows as a liquid substance, thus facilitating tube filling. After a short period of time, the hydrogen bonds reform and the toothpaste again “gels.” Final viscosity recovers after several days.

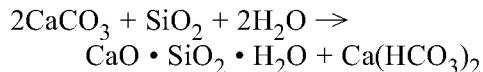
The addition of CAB-O-SIL to a toothpaste formulation will improve the product’s consistency. This provides a paste which when applied to the brush will maintain its form and separate from the tube sharply and without “stringiness.” This thixotropic effect will also aid in the suspension of polishing agents and reduce the separation of aromatic oils in water. The recommended level of CAB-O-SIL for thixotropy is 2.0 to 3.5 wt. %.

The addition of fumed silica also prevents corrosion of non-lacquered aluminum tubes containing chalk (CaCO_3) filled toothpastes. In a toothpaste containing chalk as a polishing agent, the calcium carbonate hydrolyzes to form Ca(OH)_2 , which can attack the aluminum tube. Fumed silica (SiO_2) removes the calcium hydroxide because of the low solubility of calcium silicate. This prevents the calcium hydroxide from attacking the aluminum.

The fumed silica reactions which prevent corrosion of non-lacquered aluminum tubes are as follows:



Overall:



Studies have shown that over a five-year period toothpastes containing fumed silica provide corrosion resistance to the tube at both room temperature and at 45°C.

The preparation of toothpastes containing fumed silica should proceed with the following order of addition of the ingredients. The binder (carboxymethyl cellulose, for example) is added to the water and thoroughly stirred until swelled. Next the CAB-O-SIL is added and dispersed with high shear. If the toothpaste is to be colored, the dyes can be added at this step. Adding the CAB-O-SIL to the water phase minimizes any aromatic oils being adsorbed by the high surface area of the fumed silica. Next the humectants are added, and finally the polishing agents. Any medicinal additives can be added after all other mixing is completed.

Dental Powders

CAB-O-SIL fumed silica is used in many commercial tooth powder formulations. It acts as an adsorbent for the flavoring oil and as a free-flowing and anti-caking agent so the powder will run freely from the plastic squeeze dispenser. CAB-O-SIL has proved superior to the previously used tricalcium phosphate. With the use of tricalcium phosphate, shelf life was short due to the tendency for the peppermint oil to vaporize and form a gummy residue inside the top of the container. No gummy oil residue appeared with the use of CAB-O-SIL fumed silica. CAB-O-SIL also aids in holding the powder to a wet brush. The recommended level for anti-caking applications is 0.25 to 2 wt. % and for adsorbing flavors 20 to 40 wt. % based on the weight of the oil.

Sunscreen Products

Sunscreen products can be divided into two main groups, those that absorb UV energy due to their chemical nature and those that reflect

UV energy. Reflectant sunscreens often contain inert mineral pigments such as zinc oxide or titanium dioxide. These provide good protection against UVA (i.e., wavelengths 315 to 400 nanometers) as well as UVB (280 to 315 nanometers) radiation. CAB-O-SIL® TS-720 treated fumed silica can be used as an efficient gelling agent for both types of sunscreen gels and lotions. The rheology of TS-720 allows the formulation to gel in the tube, flow during application, and spread easily on the skin. TS-720 is also hydrophobic, thereby increasing the moisture resistance of the product. All of these factors (gelling, spreadability, and moisture resistance) will boost the sun protection factor (SPF) of the sunscreen product. In addition, clear sunscreen gels can be made due to the similarity of refractive index between CAB-O-SIL and many organic liquids. the recommended level of TS-720 for this application is 1 to 3 wt. %.

Anti-perspirant (aerosol)

The use of CAB-O-SIL fumed silica keeps aerosol powders free flowing and prevents nozzle clogging. The aluminum chlorohydrate used in anti-perspirants is hydroscopic and absorbs traces of water from suspending agents, propellants, and the atmosphere. This causes them to be tacky, adhering to each other, the walls of the can and tube, and the rim of the nozzle. In time a layer builds up which is thick enough to clog the nozzle, preventing the discharge of the ingredients. Additionally, settling in the can over a prolonged period can result in a densely caked mass of active ingredients on the bottom. These ingredients will not properly re-disperse, even when the can is well shaken before use. The addition of a small amount of CAB-O-SIL will form a “coating” over the larger particles, thus acting as tiny spacers to prevent the larger particles from reagglomerating. This inhibits hard caking and maintains uniform flow of the anti-perspirant. The large surface area of CAB-O-SIL makes it possible for a very small amount to produce remarkable benefits. The recommended level of CAB-O-SIL fumed silica for this application is 0.25 to 1 wt. %.

Anti-perspirant (solid)

The presence of CAB-O-SIL fumed silica to solid (stick) anti-perspirant offers the formulator two benefits. First the CAB-O-SIL acts as a secondary binder, preventing the “bleeding” of liquids from the solid product. this is most beneficial in formulations which contain volatile silicone fluids. The second benefit is CAB-O-SIL fumed silica’s ability to act as a heat stabilizer. The addition of CAB-O-SIL prevents excessive softening at elevated temperatures. The recommended level of CAB-O-SIL for these functions is 1 to 3 wt. %.

Fragrances

In the past, plant extracts for use as natural fragrances have been limited to applications only in liquid products, such as bath oils, body and hand lotions, and shampoos. Laboratory studies have been performed creating a powdered plant extract by adsorbing the fragrance onto inert substrates. CAB-O-SIL fumed silica is especially suited for this application due to its high surface area, small particle size, and chemical purity. The silica’s high surface area physically adsorbs the fragrance converting it into a dry powder.

The affinity of these oils to the silica slows down the release of the fragrance, thus allowing the formulator to control the release rate of the scent. The recommended level of untreated CAB-O-SIL fumed silica for this application is 20 to 40 wt. % based on the weight of the oil.

Nail Polish

CAB-O-SIL fumed silica’s development of a three-dimensional network in a nail polish will prevent the settling of other pigments in the system. Once the silica network forms, it supports the other pigment particles and prevents their migration to the bottom of the container. This action is useful for both shelf storage and in preventing stratification of pigments during application. Some materials are very prone to settling and cannot be completely suspended. However, they can be prevented from forming a hard cake on the bottom of the container. CAB-O-SIL fumed silica will keep the sediment soft and easy to redisperse by simple stir-

ring or shaking. The recommended level of CAB-O-SIL® for this application is 0.25 to 1 wt. %.

Powders

Many powdered cosmetic products need to maintain their free flowing characteristics even in high humidity environments. The use of as little as 0.25 wt. % CAB-O-SIL will prevent the powder particles from clumping and forming cakes. The small particle size silica will increase the friction between the larger powder particles to keep them free flowing. This is especially useful for such products as bath powders and crystals, talc powder, and after-bath dusting powders.

CAB-O-SIL will help to maintain uniform consistency of facial powders as they are applied. The fumed silica acts as a “slipping agent,” allowing the product to slip or glide onto the skin. CAB-O-SIL will also adsorb any excess oil on the skin.

Lipstick

CAB-O-SIL fumed silica controls softening in stick-type cosmetics, such as lipsticks. Unlike preparations based exclusively on waxes, those containing fumed silica resist continual softening with increasing temperature. This ability to control temperature-induced softening or thinning is useful in many products that are exposed to the heat of a beach or poolside in summer. Mascara which contains CAB-O-SIL fumed silica will have greater resistance to temperature or preventing melting or run-off after application. CAB-O-SIL TS-530 can also be added to obtain the correct slip and feel of applied lipstick. The recommended level of CAB-O-SIL for this application is 1 to 3 wt. %.

Makeup and Creams

CAB-O-SIL acts as a gelling or thixotropic agent in facial creams and makeup products. The addition of 1 to 3 wt. % grade M-5 produces soft cream consistencies. Gels and heavy pastes require the addition of 4 to 8 wt. % fumed silica. The use of CAB-O-SIL for thickening or gelling will also provide two other benefits. The fumed silica will act as an emulsi-

fying aid, thus promoting the suspension of oils and fragrances. The fumed silica will also suspend pigments or other inert fillers. The recommended level of CAB-O-SIL fumed silica for suspension is 0.25 to 1 wt. %.

Hair Preparations

CAB-O-SIL provides thickening, improved suspension, and shelf stability to liquid and gel-like shampoos. The use of fumed silica as the thickening agent allows the formulator to create a clear gel product. Recommended levels of CAB-O-SIL for thickening are 3 to 5 wt. % for liquids and 4 to 8 wt. % for gels. Powdered hair bleaches will remain free flowing with the addition of as little as 0.25 wt. % CAB-O-SIL fumed silica.

Packaging

The untreated grades of CAB-O-SIL fumed silica are packaged in 10 lb multi-wall kraft paper bags (outside the U.S., 10 kg). The bags are unitized and sized to provide product protection, simplify handling, and maximize payloads.

Several grades of CAB-O-SIL are available in bulk packages. The bagged silica can be purchased with additional protection to reduce moisture pick-up during transportation and storage.

Treated fumed silica grades are available in 10 lb multi-wall craft paper bags (outside the U.S., 5 kg) and palletized in plastic shrouded units.

Storage

CAB-O-SIL untreated fumed silica is a very pure (> 99.8%) and chemically stable silicon dioxide. It will not chemically degrade. However, it should be noted that as the surface area of the untreated grades of fumed silica increases, the tendency to adsorb moisture during storage also increases. Due to this fact, it is recommended that the product be stored in a clean, dry area away from chemical vapors, at ambient temperatures. It is recommended that the product be used within the first two years of its date of manufacture.

The moisture content of untreated grades of fumed silica is less than 1 wt. % at the time of packaging. This will increase, depending

upon the percent relative humidity, time, and temperature.

Surface moisture can interfere in some applications, but the original moisture levels can be recovered by drying the fumed silica in an oven set to 105°C or higher. If your application is critically sensitive to moisture, contact your local representative to discuss packaging and handling options.

Although the treated grades are hydrophobic and will not adsorb moisture, they are susceptible to adsorbing chemical vapors. Therefore, it is recommended that they also be stored in a clean, dry area away from chemical vapors, at ambient temperatures.

Compliance with the various government regulations is incumbent upon the user.

Handling

Since CAB-O-SIL® fumed silica is a dry powder material, these recommendations should be followed for maximum comfort and safety:

- Avoid continued excessive inhalation. Fumed silica dust levels should not exceed an 8-hour time weighted average dust exposure of 10 mg/m³. The German MAK TRGS 900 value has been fixed at 4 mg/m³ total dust.
- Provide adequate ventilation of the work area. Where ventilation is not available, a NIOSH approved dust respirator is recommended for concentrations above 10 mg/m³.
- Wear eye protection.

- Exposure to fumed silica dust may dry the skin, hence protective skin lotions and gloves are useful.
- Clean-up of CAB-O-SIL hydrophilic fumed silica spills can be handled using a vacuum or wet absorbent materials.
- Clean-up of CAB-O-SIL treated fumed silica spills can be handled using normal methods of dust collection and disposal. Due to its hydrophobic nature, the treated fumed silica cannot be washed off with water. Water and soap, detergent, or a 70% alcohol-water mixture* are effective cleaning agents. Wet CAB-O-SIL fumed silica on a walking surface may be slippery.
- Dry powders, such as CAB-O-SIL fumed silica, can build static electrical charges when subjected to friction by pouring, conveying, or mixing. Proper safety precautions, including electrical grounding, inert atmosphere, etc., should be taken when handling near flammable or explosive liquids. For further information, see NFPA #77, **Static Electricity**.

*The 70% alcohol-water mixture should not be used near an open flame.

Toxicity

CAB-O-SIL untreated fumed silicas are not considered potential carcinogens by IARC, NTP, or OSHA. Primary routes of entry of the fumed silicas are inhalation and ingestion. The oral LD₅₀ for all grades is greater than 5,000 mg/kg.

The data and conclusions contained herein are based on studies made in Cabot Corporation laboratories and information available in published literature and are believed to be reliable. We do not guarantee that similar results and/or conclusions will be obtained by others. We disclaim any liability resulting from the use of the contents of this report.

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CAB-O-SIL® Fumed Silica in Cosmetic and Personal Care Products Selection Guide

Application	Function	Level (wt. %)	Grade(s)
Anti-perspirant (aerosol)	Suspension	0.25–1.0	M-5, H-5 ⁽¹⁾ , HS-5 ⁽²⁾ , EH-5, TS-530
Anti-perspirant (solid)	Rheology Viscosity Temperature Stability	1.0–3.0	M-5, H-5, HS-5, TS-610
Creams	Viscosity—control —gels	1.0–3.0 4.0–8.0	M-5, H-5, HS-5, EH-5
Dental Powder	Anti-caking Adsorbent	0.25–2.0 20.0–40.0	M-5, H-5, HS-5, EH-5
Fragrances	Adsorbent	20.0–40.0	M-5, H-5, HS-5, EH-5
Hair Preparations	Anti-caking	0.25–2.0	M-5, H-5, HS-5, EH-5
	Viscosity	3.0–8.0	M-5, H-5, HS-5
Lipstick	Viscosity Temperature Stability	1.0–3.0	M-5, H-5, HS-5, EH-5
	Slip/Feel	1.0–3.0	TS-530
Mascara & Makeup	Suspension Viscosity Temperature Stability Moisture Resistance	0.25–1.0 1.0–3.0 1.0–3.0	M-5, H-5, HS-5, EH-5
Nail Polish	Suspension	0.25–1.0	M-5, H-5, HS-5, EH-5, TS-610, TS-530
Powders	Anti-caking	0.25–2.0	M-5, H-5, HS-5, EH-5, TS-610, TS-530
Sunscreen Products	Viscosity Temperature Stability	1.0–3.0 1.0–3.0	M-5, H-5, HS-5, EH-5, TS-720, TS-610
	Moisture Resistance	1.0–3.0	TS-720, TS-530
Toothpaste	Rheology	2.0–3.5	M-5, H-5, HS-5

⁽¹⁾Grade H-5 is only available from production in Europe.

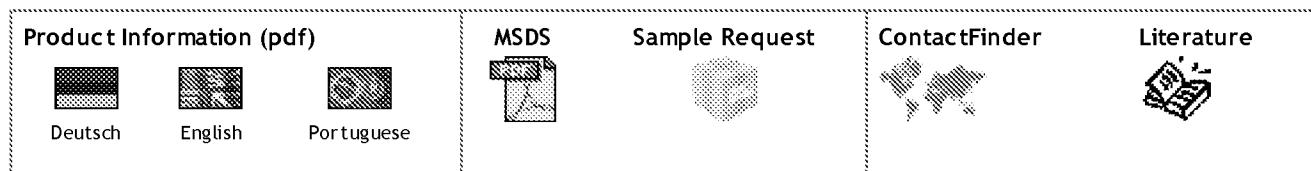
⁽²⁾Grade HS-5 is only available from production in North America.



Available Information for AEROSIL® OX 50

Region Europe / Rest of World

Back Correct Region New Search

**AEROSIL® OX 50**

Hydrophilic Fumed Silica

AEROSIL® OX 50 is the fumed oxide of our portfolio with the smallest specific surface area. High chemical purity, distinct low thickening and agglomeration properties are typical characteristics.

Applications and Properties**Physico-chemical Data****Applications**

- PET-films
- Dental composites
- Raw material for production of ultra pure silica glass according to the sol-gel-process.

Properties

- Antiblocking for plastics
- Improves dielectrical properties
- Enables high filler loading
- Broad particle size distribution
- High tapped density
- Low tendencies to form agglomerates
- Low thickening properties
- High purity

Properties

	Unit	Typical Value
Specific surface area (BET)	m^2/g	50 ± 15
Average primary particle size	nm	40
Tapped density* acc. to DIN EN ISO 787/11, Aug. 1983	g/l	approx. 130
Moisture* 2 hours at 105°C	wt.%	≤ 1.5
Ignition loss 2 hours at 1000°C based on material dried for 2 hours at 105°C	wt.%	≤ 1.0
pH in 4% Dispersion		3.8 - 4.8

Packaging and Storage	SiO ₂ - content based on ignited material	wt.%	<u>> 99.8</u>
	Sieve residue (by Mocker, 45µm) acc. to DIN EN ISO 787/18, Apr. 1984	wt.%	<u>≤ 0.200</u>

Safety and Handling

With every sample or initial shipment of our products we will send a Material Safety Data Sheet. Of course, you can also request an MSDS or any other information regarding product safety at any time, or download it as a registered user at www.aerosil.com.

Please go to the menu bar on top of the page to download the Material Safety Data Sheet (MSDS) for this product.

Registration

CAS-No.	112 945-52-5 (ex 7631-86-9)
EINECS	231-545-4
TSCA (USA), AICS (Australia), DSL (Canada)	Registered
ENCS (Japan)	1-548
ECL (Korea)	KE-30953 (KE-31032)
IECS (China)	Registered

Sample Request

To obtain a sample of a product or to find your local sales representative please use the menu on top of the page.

Commercial Contact

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Fax +49 69/218-2533
E-mail: aerosil@evonik.com

 Please use the menu bar on top of the page to download product information and Material Safety Data Sheet (MSDS) in pdf format, to request a sample or to look for a contact.

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